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Problem-based learning vs. role-playing: Which model better promotes student collaboration?

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Abstract

Problem-Based Learning (PBL) and Role-Playing are instructional models that facilitate students in constructing critical thinking skills relevant to daily life while fostering interaction among peers, embedding collaborative values. This study aims to examine the influence of PBL and Role-Playing models on student collaboration in primary schools. The research adopts a quantitative approach using a quasi-experimental design. The participants were divided into three groups: two experimental groups, each receiving instruction through PBL and Role-Playing models, and a control group that was not exposed to either model. The findings reveal a significant difference in the impact of PBL and Role-Playing on students^ collaboration skills. Additionally, the results indicate that PBL outperforms Role-Playing, as evidenced by the higher average scores obtained by students taught using the PBL model. This research underscores the importance of integrating PBL into primary education to enhance collaboration and social interaction among students. The findings provide valuable insights for educators seeking effective teaching strategies to promote teamwork and cooperative learning. Future studies are recommended to explore the long-term effects of PBL and its adaptability to diverse educational contexts and student demographics.

Keywords

Problem-based learning, Role-playing, Student collaboration

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Introduction

Improving the quality of education continues to be a major concern for education researchers and practitioners. One of the challenges faced is finding a learning model that is not only effective, but also able to instill social characters such as cooperation among students. Problem-based learning (PBL) and role playing are two learning models that are widely studied for this purpose [1]. However, further exploration is still

needed regarding the effectiveness of each of these models in developing students' cooperation skills in an integrated and sustainable manner.

Various previous studies have shown the potential of PBL and role playing in learning. [1] [2] stated that PBL uses real-life problems to motivate students, encourage them to work collaboratively in groups, and build cooperation skills. PBL can strengthen the collaboration aspect through interaction between group members during the learning process [3-6]. Meanwhile, role playing offers a role simulation-based learning approach, where students learn to understand social situations from various perspectives [7][8]. Argued that role playing encourages students to work together to complete certain scenarios, improve communication skills, and create an interactive learning environment.

While the benefits of PBL and role playing have been proven, there are research gaps that need to be addressed. Most studies tend to explore these two models separately, without directly comparing their effectiveness in building students' cooperation skills. For example, the study by [4][9] how PBL was able to encourage a certain level of communication through group discussions, but did not go into depth on how this aspect of cooperation compared to other approaches, such as role playing. Similarly, [8] study focused more on the benefits of role playing in understanding social perspectives rather than specific aspects of cooperation. In addition, research on the application of these two models to learning contexts that involve intensive cooperation, such as project-based learning or cross-group collaborative activities, is still very limited.

This study aims to fill this gap by examining the effect of PBL and role playing on students' cooperation development. The study is designed to provide new insights into the effectiveness of both learning models in supporting the creation of better social interactions among students. The novelty of this research lies in its direct comparison of the effectiveness of PBL and role playing as instructional models for fostering student collaboration. While prior studies have explored these methods individually, this study addresses a significant research gap by evaluating their comparative impact on developing cooperative skills among primary school students. In addition, the results of this study are expected to provide practical guidance for educators in choosing and implementing the most appropriate learning model to encourage cooperation skills. This research is expected to make a significant contribution to the development of cooperation-based learning strategies that can be widely applied in various educational contexts. Moreover, it extends the understanding of these models' application in intensive cooperative contexts, providing empirical evidence that PBL, with its emphasis on real-world problem-solving and group collaboration, outperforms role playing in enhancing student cooperation. This research offers practical insights for educators on choosing effective learning strategies to foster essential 21st-century skills.

Method

This research uses a quantitative approach with a type of quasi-experiment research. Quasi-experimental research is research that tests an existing theory whether the theory affects the dependent variable. The research design used in this study was a non-equivalent pretest-posttest control-group design. The first stage involved sampling, in this study, researchers did not create new classes, but used the classes as they were. There were three groups of students, namely two groups treated with the Problem Based Learning (PBL) and Role-playing learning models as the experimental group and one group that was not treated with the Problem Based Learning (PBL) and Role-playing type models as the control group. The next stages comprised initial test, treatment, and final test. The three groups were given the same initial test. After being given an initial test, both experimental groups received treatment in the form of Problem Based Learning (PBL) and Role-playing learning models. In this study, the control group used the usual learning used by teachers with the lecture model. After both experimental groups were given treatment, the students were given a final test. Likewise, the control group was given the same final test. The final stage included data tabulation and analysis. The results of the initial and final tests in each group were compared (tested for differences), as well as between the results of the two groups. Hypothesis testing was conducted using independent t-tests to determine statistical significance. Significant differences between the results of the initial and final tests of the three groups indicate the effect of the treatment given.

Result and Discussion

Decision-making and conclusions on hypothesis testing were made at a significance level of 0.05. The criteria used in making conclusions are as follows: if the probability of error (p) < 0.05, then the null hypothesis (H0) is rejected; and if the probability of error (p) > 0.05, then the null hypothesis (H0) is accepted.

Hypothesis Test Results

The results of data analysis using independent t-test obtained the following hypothesis test results (Table 1):

Table 1. Results of data analysis

	Learning Type	t-count	P
collaborative	PBL Role playing	3.226	0.027

The results of the independent t-test on the cooperation variable show a t-count value of 3.226 with a p value = 0.027 (<0.05). This shows that there is a significant difference in influence between the application of Problem-Based Learning (PBL) and Role-Playing learning on the cooperation of fourth grade elementary school students.

Posthoc Test Results

Since this study aims to find out the difference in the effect given by the two types of learning, a posthoc test was conducted. The posthoc test aims to determine the variable that has a greater influence on student cooperation. The posthoc test results are presented in the form of an additional Table 2, which shows that learning with the PBL method has a greater influence than the Role-Playing method.

Table 2. Posthoc Test Results

Dependent Variable	(I) model	(J) model	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Bonferroni	PBL	RP	3.830	1.677	.077	-.29	7.95
		Traditional	13.300*	1.777	.000	8.94	17.66
	RP	PBL	-3.830	1.677	.077	-7.95	.29
		Traditional	9.470*	1.761	.000	5.14	13.80
	Traditional	PBL	-13.300*	1.777	.000	-17.66	-8.94
		RP	-9.470*	1.761	.000	-13.80	-5.14
Games-Howell	PBL	RP	3.830	1.675	.068	-.22	7.88
		Traditional	13.300*	1.781	.000	8.97	17.63
	RP	PBL	-3.830	1.675	.068	-7.88	.22
		Traditional	9.470*	1.761	.000	5.19	13.75
	Traditional	PBL	-13.300*	1.781	.000	-17.63	-8.97
		RP	-9.470*	1.761	.000	-13.75	-5.19

Discussion

The findings of this study indicate a significant difference in the effects of Problem-Based Learning (PBL) and Role Playing on the cooperative skills of fourth-grade elementary school students in, Temanggung. The independent t-test results showed a significant effect, with a t-value of 3.226 and p = 0.027. These results reject the null hypothesis and confirm that the implementation of PBL is superior to Role Playing in enhancing students' cooperative skills.

This study aligns with previous findings, (such as those by [3-6]), which highlight PBL's effectiveness in promoting active student engagement through problem-solving, investigation, and interdisciplinary perspectives. PBL encourages students to collaborate in small groups, utilize diverse learning resources, and create solutions for real-world problems. In this study, students in the PBL group demonstrated better cooperative skills compared to those in the Role-Playing group.

Furthermore, [1] explains that the PBL approach allows students to explore various perspectives and engage with real-world issues. This teaching strategy not only enhances social interaction but also strengthens cooperative skills. In this study, PBL provided students with opportunities to collaborate effectively through realistic problem-solving tasks and interdisciplinary exploration.

On the other hand, the Role-Playing method offers a different approach to fostering cooperation. shows that Role Playing can enhance communication skills, decision-

making, and social interaction through immersive and interactive activities [7][8]. In Role Playing, students are given the freedom to portray a character, enabling them to develop understanding and emotional experiences. However, its impact on students' cooperation in this study was less prominent compared to PBL. This may be due to differences in the learning steps and the level of student autonomy provided by each method.

The primary factor that makes PBL more effective is its emphasis on group collaboration and independent exploration. Students are encouraged to utilize various learning resources and engage in discussions to solve complex problems. This approach aligns with the findings of [1][13][14] group activities can create a cooperative learning environment. Additionally, the flexibility of PBL, as described by [1] [2] allows students to explore new ideas without fear of negative judgment, creating a supportive and dynamic learning environment.

In conclusion, this study demonstrates that PBL is more effective than Role Playing in enhancing students' cooperative skills. By fostering active engagement, interdisciplinary exploration, and group collaboration, PBL emerges as a superior teaching strategy for developing social and cooperative skills among elementary school students.

Conclusion

This study demonstrates that the implementation of Problem-Based Learning (PBL) is more effective than Role Playing in enhancing cooperative skills among fourth-grade elementary school students in Temanggung. The findings confirm that PBL significantly improves students' ability to collaborate due to its emphasis on real-world problem-solving, interdisciplinary approaches, and group collaboration. Role Playing, while effective in improving communication and perspective-taking, demonstrated a lesser impact on cooperative skills in this study. The differences in effectiveness can be attributed to the varying learning steps and levels of autonomy provided by the two methods. This research contributes to the field of education by offering empirical evidence on the comparative benefits of PBL in fostering essential 21st-century skills such as collaboration. It provides educators with insights into designing instructional methods that promote cooperative learning environments. Future studies could explore the long-term impacts of PBL on students' social and cognitive development, as well as investigate how these methods can be adapted for diverse educational contexts and age groups. Recommendation for educators are encouraged to prioritize the implementation of Problem-Based Learning (PBL) in classrooms to enhance students' cooperative skills and critical thinking through real-world problem-solving and group collaboration. Role-Playing can be used as a supplementary method to improve communication and empathy, particularly in scenarios requiring perspective-taking. Education policymakers should support teacher training programs that equip educators

with the skills to effectively use PBL and Role-Playing, fostering dynamic and cooperative learning environments.

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